1853MNRAS..14...49P

greatest confidence, partly on account of their accordance and partly from the superiority of the instruments with which they were made. Their mean, viz. $12^h\ 51^m\ 43^s\!\cdot\!75$, or in mean time, after all corrections were applied, including the error of the watch, $22^h\ 7^m\ 40^s\!\cdot\!7$ (June 5), was accordingly employed as the basis of calculation, in which account is taken of the heights of the barometer and thermometer at the time of observation. The following are the observations from which the latter data were deduced :—

	h m	Bar.	Ther. ° ′	
June 5	2 30	0·764,8	26	(Centigrade)
6	2 25	0·764,02	26 3	—

The calculations for the determination of the longitude were executed by M. Adam Kutcyski. They give for the longitude of Papeété : —

	h m s
In Time	10 7 34·31
Arc	151 54 4·65

These numbers have reference to the meridian of Paris. They present a satisfactory agreement with the longitude indicated in the *Connaissance des Temps.* In the latter work the longitude of Point Venus is stated to be 151° 49′ 19″. Now M. Kutcyski, by a process of triangulation based upon this determination, found the longitude of the Government House of Papeété to be 151° 54′ 4″·5, which differs only 15 hundredths of a second from the result obtained by means of observations of the eclipse.

On the Parallax of Argelander's Star. By Prof. C. A. F. Peters.*

In this paper M. Peters subjects to a critical discussion the recent researches of M Wichmann on the parallax of Argelander's star (1830 Groombridge), and assigns what he considers to be the most trustworthy results deducible from the observations.

The basis of M. Wichmann's investigation consisted of a series of heliometric measures of the distance of Argelander's star A, from three other stars in its vicinity, a, a', a''.† The star a was on one side of the principal star, A, and the stars a', a'', were on the other, all the four stars being nearly upon the same parallel.

By a discussion of the observed *differences* of the distances of the stars of comparison from the principal star A, M. Wichmann found the parallax of the latter star to be 0″·135, with a probable error of 0″·013, the parallaxes of the stars of comparison being supposed to be insensible.

A similar discussion of the observed *sums* of the distances presented a peculiar difficulty in consequence of the maximum effect

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* *Ast. Nach.* No. 865–6.

† The stars are here denoted as in Wichmann's Researches, for an abstract of which see *Monthly Notices*, vol. xiii. p. 131.

1853MNRAS..14...49P

produced by the influence of temperature on the instrument, being almost coincident with the maximum effect of parallax. M. Wichmann was, therefore, obliged to adopt two distinct hypotheses in the conduct of this part of his investigation. By the first hypothesis the observed variations of the sums of the distances were supposed to arise entirely from the influence of temperature on the instrument at different seasons of the year; by the second hypothesis, Bessel's coefficient of temperature was introduced into the investigation as a definitive result, and the residual effect was attributed entirely to parallax. The first hypothesis gave for the coefficient of temperature a value greatly exceeding that which Bessel had deduced from his researches on the subject. By the second hypothesis, M. Wichmann found the parallax of a to be $1''\cdot17$, and that of A to be $0''\cdot71$, assuming the parallaxes of a' and a'' to be insensible.

M. Wichmann is of opinion that the last-mentioned value of the parallax of A ought to be regarded as the most trustworthy which has hitherto been deduced.

Bessel's investigation of the coefficient of temperature was founded on a series of heliometric measures of the distances of *Halcyone* from ten other stars of the *Pleiades*. These measures had been executed by Bessel, Schlüter, and Plantamour, during the interval comprised between the years 1830 and 1840. Denoting the value of this coefficient by ε, Bessel deduced from his researches, $\varepsilon = +0\cdot00000378$ with the probable error $0\cdot00000045$.

Dr. Peters found, however, that after Bessel's correction for temperature thus found had been applied to these observations, and they were in other respects completely reduced, the outstanding errors *varied with the season of the year*, and (taking into account the distances measured in both cases) were of the same order of magnitude as $1''\cdot17$, the value which M. Wichmann obtained for the parallax of the star a by an investigation of the *sums* of the distances of the comparison stars from the principal star A.

These variations could not be explained by the effect of parallax, since, although the stars of comparison lay in every direction round the standard star, the variations for each day of observation always took place in the same direction.

It was evident, therefore, that no reliance could be placed on a result of parallax, the value of which was determined by employing Bessel's correction for the influence of temperature on the instrument.

From Schlüter's measures alone M. Peters determined the value of ε to be $+0\cdot00001243$ with a probable error of $0\cdot00000073$. Hence it is evident that the uncertainty attending Bessel's determination of the coefficient of temperature is far greater than its probable error indicates. Upon this ground M. Peters maintains that to ascertain beyond doubt the influence of temperature, a series of direct measures of the focal length of the instrument is indispensable. Until these be executed, every determination of parallax which is deduced in such a way that the uncertainty in the value

1853MNRAS..14...49P

of ε is capable of exercising a sensible influence on the result, ought to be regarded as illusory.

The value of ε, which M. Peters deduced from Schlüter's observations, considerably exceeds that which M. Wichmann obtained for the same coefficient by a discussion of his own observations of the sum of the distances, upon the hypothesis that the effects of parallax are insensible. M. Peters therefore maintains that no weight can be attached to the objection urged by M. Wichmann to that hypothesis, founded upon the large magnitude which it assigned to the coefficient of temperature, compared with the value of the same element which Bessel deduced from his researches.

M. Peters also found that the values of ε deducible from experimental measures executed by M. Struve with the Dorpat and Pulkowa refractors, were, in both cases, considerably greater than Bessel's value.

Besides a variation depending on the season of the year, and indicating an erroneous value of Bessel's coefficient of temperature, it appeared that the observations, both of Schlüter and Wichmann, were frequently affected with a constant error for each day of observation. This error appeared to be totally independent of the indications of the thermometer, and was found to affect the measures to the extent of 1″ in twenty-four hours.

M. Peters remarks that the outstanding errors by which the sums of the distances are affected when Bessel's coefficient of temperature is employed, and the difference of the parallaxes of the stars of comparison is supposed to be insensible, are attributable partly to an error in the value of the coefficient of temperature, and partly to unknown causes. He is of opinion, however, that the difference between the temperature of the interior of the telescope and the temperature outside, exercises a considerable influence upon these errors.

With respect to the value of the parallax of A, which M. Wichmann deduced from the differences of the observed distances of the stars of comparison, viz., 0″·135, with the probable error 0″·013, M. Peters considers it to be a result entitled to great confidence. In this case the measured distances of the stars of comparison from the principal star being nearly of equal magnitude, any constant error for each day of observation must necessarily almost disappear from their differences, whether arising from the optical imperfection of the instrument, the unequal heating of the air in the interior of the tube, the difference of the temperature within and the temperature outside, the uncertainty in the value of the coefficient of temperature employed in reducing the observations or the combined operation of all these causes.

Although the parallax which M. Wichmann obtained by a discussion of the differences of the distances was admitted by M. Peters to constitute a good approximation to the true value, still it occurred to him that, on account of the importance of the subject, it would be desirable to deduce the same result by such a method that the uncertainty in the value of the thermometric coeffi-

1853MNRAS..14...52S

cient, and especially every error calculated to operate proportionally to the measured distance, would be *totally* eliminated. He, therefore, subjected the observations of Schlüter and Wichmann to a process of treatment, similar to that by which on a former occasion he had deduced the parallax of 61 *Cygni*. In this manner he found the relative parallax of A to be +0″·141, with the probable error 0″·013, and estimating the parallaxes of the stars of comparison by the aid of his former researches on the parallaxes of the stars of different magnitudes, he found the absolute parallax of A to be 0″·148.

This result agrees very nearly with that which M. Wichmann deduced from the differences of the distances, and appears to M. Peters to afford a sufficient confirmation of his remark, that the latter result is influenced in only a very small degree by the uncertainty in the value of the coefficient of temperature, or any other cause of error which may operate proportionally to the distance.

Memorie dell' Osservatorio dell' Universita Gregoriana del Collegio Romano, diretto dai PP. della Compagnia di Gesu. Anno 1851.

This volume contains a record of the labours of Prof. Secchi at the Observatory of the Collegio Romano during the year 1851. It is divided into two Parts. The first relates to astronomical subjects; the second is devoted to observations of a purely meteorological nature. Part I. is divided into four sections. The first section contains the observations with the meridian circle. The second is devoted to observations of comets and of the newly-discovered planets with the Cauchoix refractor. The third contains a variety of physical observations of *Saturn* and his rings. It appears from these observations, that the interesting phenomenon of a difference of colour at the opposite ansæ of the obscure ring, which was noticed by Mr. Lassell during his late residence at Malta,* had been remarked by Prof. Secchi in the autumn of 1851. The following passage, extracted from the record of the observations of the planet, may be cited in relation to this fact:—

"Sept. 2, 1851. The obscure ring is very distinct, the Cassinian division is well defined, and there are some traces of a subdivision of the exterior ring. The obscure ring is more distinct, and somewhat of a rose colour on the left side of the observer; on the right side it appears of a bluish colour."

The fourth section of Part I. contains an account of the researches of Sig. Sestini on the colours of the stars. There is an Appendix to the work, containing an account of researches upon the distribution of heat on the surface of the sun, and also experiments on the azimuthal motion of the pendulum, instituted with the view of proving the rotation of the earth.

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* See p. 148 of vol. xiii. of the *Monthly Notices.*